8. ABSTRACT

The present invention relates to an Inductive Monitoring System (IMS), its software implementations, hardware embodiments and applications. Training data is received, typically nominal system data acquired from sensors in normally operating systems or from detailed system simulations. The training data is formed into vectors that are used to generate a knowledge database having clusters of nominal operating regions therein. IMS monitors a system's performance or health by comparing cluster parameters in the knowledge database with incoming sensor data from a monitored-system formed into vectors. Nominal performance is concluded when a monitored-system vector is determined to lie within a nominal operating region cluster or lies sufficiently close to a such a cluster as determined by a threshold value and a distance metric. Some embodiments of IMS include cluster indexing and retrieval methods that increase the execution speed of IMS.